**Physical Science Lab**

**THE WHITE POWDER LAB**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_

Partners: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The white powder lab is a classic lab used from early grades up through college classes, modified to the level of the students. Usually there are 3 to 6 different powders that might include table salt, sugar, cornstarch, baking soda, baking powder, plaster of paris or flour. Each of these white powders is tested with several chemicals and observed very carefully with a hand lens. Possible things to test with include water, vinegar, iodine and possibly heating over a flame.

Put the five or so mystery powders in separate containers, perhaps plastic bags, and label these with letters A, B, C, D or E. You could divide the class into groups so that smaller groups of 4 or 5 have access to their own white powders. Possibly the teacher could have two stations on opposite sides of the room where all the white powders can be accessed by the closest groups. Each lab group should ideally have their own water, iodine (optional), vinegar, hand lenses and equipment for heating. The simple chemical reactions and observations can be done on clear acetate sheets (overhead sheets?) partitioned off with markers. Eyedroppers should be used for the liquids and Popsicle sticks can be used for the powders, a different one for each powder (labeled A, B, etc.). For older students heating the powders is an interesting test. Fashion a small piece of aluminum foil into a dish and pick this up with a spring clothespin. Put a small amount of powder in the “dish” and heat over a candle flame for a minute or so. With all of these tests the reactions should be recorded on the grid at the appropriate place.

When all the powders have been tested and data recorded, unknown powders should be given to the students. Sometimes these are single powders or two mystery powders mixed together equally. Students should be able to determine what these mystery powders are based on their previous observations and testing. It is a great lab activity easily modified for different grade levels. For a 5-powder/3-test lab with 1 or 2 unknowns, it usually takes at least 45 minutes. It is recommended that each powder be tested one at a time to avoid confusion. In the classroom, the initial powders can be tested one day and the next day the students could use their data sheets to then determine unknown powders given by the teacher.

WHITE POWDER UNKNOWNS **- Safety Rules**

\*Use small amounts of these powders!

\*Do not mix up powders and do not taste them!

\*Every student should be in on the testing and observations!

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Table Salt | Sugar | Corn Starch | Baking Soda | Flour |  |
| (NaCl) | (C6H12O6) | (C27H48O20) | (NaHC03) |  |
| (C6H10O5) |  |
|  |  |  |  |  |  |

Texture and

Color

Reaction with

H2O

Reaction with

Vinegar

Reaction When  
  
 Burned

(teacher will do this)

Now, you will be given unknowns (A and B) or (C and D) - determine what they are! Write down detailed observations, then your best choice in the blank at the left.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Circle choice | Texture | Reaction | Reaction | **What is the Unknown?** |  |
| and Color | with H2O | with Vinegar |  |  |
|  |  |
| **Unknown A** |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| **Unknown B** |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Questions to Answer. Collaborate: This means that each person should contribute.

1. Which was the only substance that reacted visibly with vinegar?
2. Which substance did not absorb water as well as the others?
3. List some of the textures you observed before you performed any tests on the substances.
4. Given the formula of sugar (C6H12O6), which element do you think was formed after the sugar was burned and a black substance was formed?
5. Which of the tests you performed helped you identify the unknowns the most easily?
6. Which of the substances produced any odors when burned?
7. Which of the substances had -movement when burned?
8. Why is it good lab practice not to taste or smell any substances found in the lab?
9. Which substances did not change when burned?
10. What is the definition of a chemical change? (look it up if you need to)
11. Which of the substances underwent a chemical change? How did you know?
12. Was this a controlled experiment? Why or Why not?
13. What does each of the symbols stand for in C6H1206? Use Periodic Table.

C \_\_\_\_\_\_\_\_\_\_\_\_\_ H \_\_\_\_\_\_\_\_\_\_\_\_\_\_ O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What does each of the symbols stand for in NaHCO3?

Na \_\_\_\_\_\_\_\_\_\_\_\_\_ H \_\_\_\_\_\_\_\_\_\_\_\_\_\_ C \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ O \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

15. Look at the elements in Vinegar and Baking Soda chemical formulas. Why did the two react?

Vinegar - C2H4O2

Baking Soda - NaHCO3

16. Look at your lab sheet. List the compounds.



17. Write the **reactants** in an equation for the vinegar and baking soda reaction.

18. What was the gas emitted from the chemical reaction. (Hint: Look at your reactants to see what could have combined to form the gas.)